UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/525,616	03/21/2005	Paul Leslie Burn	480821.00012	7790

26710 7590 11/24/2009

QUARLES & BRADY LLP
411 E. WISCONSIN AVENUE
SUITE 2040
MILWAUKEE, WI 53202-4497

EXAMINER	
CROUSE, BRETT ALAN	
ART UNIT	PAPER NUMBER
1794	

NOTIFICATION DATE	DELIVERY MODE
11/24/2009	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

pat-dept@quarles.com

Office Action Summary	Application No.	Applicant(s)	
	10/525,616	BURN ET AL.	
	Examiner	Art Unit	
	Brett A. Crouse	1794	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *09 July 2009*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-6,8-14,16,17,24,26-28 and 35-39* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-6,8-14,16,17,24,26-28 and 35-39* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *20090710*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 9 July 2009 has been entered.

Status of Claims

2. The amendment filed 9 July 2009, amends claims 1 and 24.

3. Claims 1-6, 8-14, 16, 17, 24, 26-28 and 35-39 are pending.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 1-6 and 8-17 are rejected under 35 U.S.C. 102(b) as being anticipated by Tomalia et al., US 5,714,166 with further evidence provided by Mijovic et al., Macromolecules, (2007), Volume 40, Pages 5212-5221 and Encyclopedia Britannica, Online, (2004).

Tomalia teaches:

As to claims 1-6, 16:

Column 14, lines 56-64, teaches dendrimers of generation 1-5.

Column 11, lines 64-67, teaches the notation of the dendrimers is the generation and (core).

Column 44, lines 37-42, figure 15, teaches mixed dendrimers of different generations.

Column 104, line 1 through column 105, line 43, table XII, teach as examples P and Q blends of dendrimers in which three or more dendrimers of different generation have the same core and include a dendrimer of generation 1. The passage also teaches the percentages of the each of the dendrimers used. The passage teaches complexing the dendrimers with an enzyme. This is equated with modifying the surface, resulting in matching surface groups upon the various dendrimers of the blend.

As to claims 8-10, 17:

Column 16, line 56 through column 17, line 5, and column 19, lines 11-28, teach the dendrimers can include fluorescent and phosphorescent emitting entities. The passage additionally teaches the dendrimer can comprise metal chelates.

Column 17, lines 41-65, teaches that the "associated" material can be chemically bonded to the dendrimer.

As to claims 11-14:

Column 60, line 19 through column 63, line 9, teach aniline derivatives can be a component of the dendrimer.

References as Further Evidence:

Mijovic teaches the conductivity of PAMAM dendrimers is both highly temperature dependent and dependent upon the generation of the dendrimer. The conductivity range reported by Mijovic is on the order of 10-7 to 10-4 S/cm. (Figure 11, Page 5220)

Encyclopedia Britannica teaches the range of conductivity values reported by Mijovic for the various generations of PAMAM dendrimers fall within the semiconductor range of values as would be understood by one of ordinary skill in the art.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

7. Claims 1, 3-6, 11, 12, 13, 14 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Inoue et al., US 2002/0102434.

Inoue teaches:

Paragraph [0022], formula (I), teaches an electroluminescent device comprising a compound of formula (I).

Paragraphs [0058]-[0062], teach the R_{01}, R_{02}, R_{03} and R_{04} substituents of formula (I). The passage additionally teaches in paragraph [0060] that an aryl substituent can be further substituted with one or more additional aryl amine groups. Such substitution allows for the formation of higher generation dendrimers. The passage additionally teaches alkyl groups, preferably methyl groups, as substituents upon the aryl groups.

Paragraphs [0148] and [0156], teach the compounds of formula (I) can be used alone or combination.

Paragraph [0147], teaches compounds of formula (I) have a high hole mobility.

Inoue does not teach:

Inoue does not provide an example of a mixture of compounds of formula (I). However, Inoue teaches compounds of formula (I) can be used in combination.

Statement of Obviousness:

It would have been obvious to one of ordinary skill in the art at the time of invention by applicant to use in combination a plurality of compounds of formula (I) of Inoue, as suggested by Inoue, having the R_{01}, R_{02}, R_{03} and R_{04} substituents resulting in multi-generational dendrimers having a high hole mobility as taught by Inoue.

With regard to the surface groups of the compounds of Inoue it would have been obvious to use the preferred surface groups of alkyl (methyl) as taught by Inoue in the compounds of Inoue such as provided in the example compounds of Inoue.

8. Claims 2, 8, 9, 10, 24, 26-28 and 35-39 are rejected under 35 U.S.C. 103(a) as being unpatentable over Inoue et al., US 2002/0102434, as applied to claims 1, 3, 4, 5, 6, 11, 12, 13, 14 and 16 above, and further in view of Baldo et al., Physical Review B, (2000), Volume 62, Number 16, Pages 10,958-10,966.

The teachings of Inoue as in the rejection above are relied upon.

Inoue teaches:

Paragraphs [0149]-[0150], teach electroluminescent device structures comprising one or more hole transport/injection layers, a light emitting layer, and one or more electron transport/injection layers.

Paragraph [0152], teaches compounds of formula (I) can be used in the hole injecting, hole transporting and light emitting layers.

Paragraph [0148], teaches the compounds of formula (I) can be used in combination of two or more.

Paragraph [0153], teaches compounds of formula (I) can be use in combination with a resin.

Paragraph [0158], teaches the light emitting layer can additionally comprise an additional fluorescent dopant.

Paragraph [0159], teaches proportions of materials in a mixed light emitting layer.

Paragraph [0177], teaches the light emitting layer can comprise three materials providing the function of hole transport, electron transport and fluorescent emission.

Paragraph [0186], teaches the compounds of Inoue are strong blue fluorescent materials.

Inoue does not teach:

Inoue does not teach the phosphorescent light emitting properties of the compounds of formula (I). However, Inoue teaches the compounds are blue fluorescent materials which are useful in the light emitting layer of an electroluminescent device.

Inoue does not teach the use of the compounds in a photovoltaic device.

It would have been obvious to one of ordinary skill in the art to expect the compounds of Inoue to provide the material properties of the compounds such as charge mobility to a layer similarly provided to a photovoltaic device.

Baldo teaches:

Page 10,961, teaches TPD is useful as a fluorescent host material. The passage also teaches the measurement of the phosphorescent properties of TPD.

Statement of Obviousness:

It would have been obvious to one of ordinary skill in the art to expect the higher generation dendrimers of Inoue to exhibit similar phosphorescent properties of the generation 1 dendrimer, TPD, due to the structural similarity between the compounds. It would additionally have been obvious to use the dendrimers as host materials in the light emitting layer as taught by Baldo and suggested as suitable by Inoue with the expectation that the materials would provide light emission and high hole mobility as suggested by the references.

It would have been obvious to one of ordinary skill in the art to optimize the relative proportions of the dendrimers in order to arrive at a desired hole mobility and emissive property of the composition.

Response to Arguments

9. Applicant's arguments have been considered but are moot in view of the new ground(s) of rejection.

Applicant argues that the dendrimers of Tomalia are not conductive or light emitting as required by amended independent claim 1.

Attention is directed to column 17, lines 41-65 which teach that the "associated" material can be chemically bonded to the dendrimer. The teachings of column 16, lines 51-52 indicate that the associated material would be expected to provide the properties of the material to the resulting dendrimer. Attention is also directed to example 21 which teaches the inclusion of fluorescent terminal groups upon the dendrimer.

With respect to applicant's conductivity argument, no bounds for what constitutes a conductive polymer of the instant invention has been added to the claims beyond generic wording. Applicant includes Luo et al., Journal of Applied Polymer Science, as evidence that PAMAM polymers are non-conductive. Luo makes only a blanket statement with regard to the electrical properties of PAMAM/DR. Please see Mijovic et al., which is included with this mailing. Mijovic teaches the conductivity of PAMAM dendrimers is both highly temperature dependent and dependent upon the generation of the dendrimer. Additionally, please see the

attached table of conductivities from Encyclopedia Britannica. The range of conductivity values reported by Mijovic for the various generations of PAMAM dendrimers fall within the semiconductor range taught by Encyclopedia Britannica.

Applicant argues that Tomalia does not teach mixtures of dendrimers having the same core and repeat unit but different generations. Applicant argues that the discussion cited in column 30 of Tomalia or Tomalia as a whole does not teach or suggest a matching core and repeat unit.

Attention is directed to, for example, the cited blends P and Q, columns 104 and 105. The core is indicated in parens and the generation by the number. The discussion beginning on column 30, line 51 teaches matching core and repeat unit such as in column 31 which teaches a homopolymeric dendrimer where the same repeat unit is used throughout the molecule. Various example dendrimers of Tomalia provide a series of dendrimers wherein the generation of the dendrimer is extended using the same material as the previous generation. See for example Examples N through T, Examples W through DD and Examples GG through HH. It is of no moment that Tomalia does not embody a mixture of (polyaminoamine) dendrimers having a common core wherein the generations of the dendrimer are formed from the same chemical repeat unit and the use of combinations of such dendrimers for the proposes of Tomalia.

With respect to the rejections over Inoue and Inoue in view of Baldo applicant argues Inoue alone or in combination with Baldo does not teach or suggest the use of a combination of materials constituting dendrimers having the same core and repeat unit of differing generations.

Applicant argues the teaching of Inoue is to broad to suggest a combination of materials having the same core and dendron repeat units.

Inoue teaches as the central ring of formula (I) a phenylene ring. The repeat units (R_{0n}) provide nitrogen substituted phenyl rings in the formation of the additional generations. Thus Inoue provides a matching core and repeat unit structure. The tables of Inoue additionally provide numerous examples for (R_1 - R_4) that provide nitrogen, phenyl, nitrogen, phenyl structures as preferred substituents of the rings of formula (I). The example compounds of the tables of Inoue provide numerous examples of R groups which provide an N - phenyl - surface group or N - phenyl - N - phenyl - surface group pattern as the substituents to the core. Phenylene cores are taught as the basis of L_o of formula (I). Inoue teaches the compounds can be used alone or in combination for the same purpose. Inoue therefore teaches or suggests that compounds having matching core phenylene groups and the substitution patterns exemplified by the examples would be expected to suitably work together in combination in the device of Inoue.

Applicant also argues that the attached declaration provides a showing of unexpected results. The scope of the showing of the declaration is not commensurate in scope with the claims. The declaration provides one experimental example while the scope of the claims is to any combination of dendrimers that have the same core with matching dendrimer repeat units and differ in generation.

With respect to the rejection over Inoue in view of Baldo applicant argues that Baldo is not relevant to the current claims because it teaches a guest host system and that the claimed invention does not require guest host system. It is noted that instant claim 27 is directed to a device comprising an additional emissive dopant.

Applicant additionally argues that the compounds of Inoue would not have similar properties due to similarities in structure. Applicant cites references by Zhao and Xin as a comparison between TPD and pyrene.

This is not persuasive as the implied compound in question would be, for example, a compound such as compound 22 or 23 of Inoue. The cited references do not teach the effects of the combination of TPD with pyrene and it is noted that both pyrene and TPD have high intensity luminescence peaks at wavelengths slightly shorter than 400 nanometers. US 2005/0079385 is additionally cited by the examiner as an indication that pyrene derivatives have suitable properties to be used in combination with $Ir(ppy)_3$.

Applicant also argues that the triplet emission of TPD as taught by Baldo is measured at low temperature and therefore the teachings of Baldo would not be combined with Inoue.

The teachings of Baldo are included to teach that one of ordinary skill in the art would expect the compounds of Inoue to inherently possess similar triplet energy to the TPD compound of Baldo due to structural similarity. Therefore, Inoue teaches as a single reference triplet emission from the compounds of Inoue and Baldo quantifies the expected property.

Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Brett A. Crouse whose telephone number is (571)-272-6494. The examiner can normally be reached on Monday - Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, D. Lawrence Tarazano can be reached on 571-272-1515. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/B. A. C./
Examiner, Art Unit 1794

/D. Lawrence Tarazano/
Supervisory Patent Examiner, Art Unit 1794